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SIEMENS CORPORATION  
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170 WOOD AVENUE SOUTH  
ISELIN, NJ 08830

EXAMINER
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EASTMAN, AARON ROBERT

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3745

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PAPER

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/797,376  
Filing Date: March 10, 2004  
Appellant(s): RICHTER ET AL.

\_\_\_\_\_  
Janet D. Hood Reg. # 61,142  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed July 15, 2009 appealing from the Office action mailed October 10, 2008.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

5,474,421	Rossmann	12-1995
4,659,282	Popp	4-1987
5,498,136	Namura et al.	3-1996

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over USP 5,474,421 (Rossmann hereinafter) in view of USP's 4,659,282 (Popp hereinafter) and 5,498,136 (Namura et al. hereinafter).

In re claim 1 Rossmann discloses a blade row of a turbo-machine, comprising: a blade (2, 3) having a root (2', 3'), a center region, a tip a leading edge and a trailing edge, the blades arranged circumferentially adjacent to each other to form a row; a shroud plate (8, 8') arranged at each blade tip, the shroud plate (8, 8') adapted to inhibit untwisting of the blades (2, 3), the shroud plates (8, 8') further including a saw-tooth-shaped contact region (18, 18') such that adjacent shroud plates (8, 8') are attached one inside the other thereby restricting blade movement about a center of axis of rotation.

Rossmann does not disclose a titanium alloy blade or a support element arranged between adjacent blades of the blade row located approximately in the blade center region and coupling the adjacent blades.

Popp teaches titanium alloy rotor blades (col. 1 lines 17-19 of Popp) and Namura et al. teach a support element (3) arranged between adjacent blades of a blade row located approximately in the blade center region and coupling the adjacent blades (Fig.'s 6, 8 and 9 of Namura et al.).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Rossmann by forming the blades of titanium alloy as taught in Popp for the purposes of low weight and high strength (col. 1 lines 40-43 of Popp) and by adding a support element arranged between adjacent blades of the blade row located approximately in the blade center region and coupling the adjacent blades as taught in Namura et al. for the purposes of heightening rigidity and vibration dampening functions (col. 1 lines 20-21).

In re claims 2-14 the Rossmann modification in re claim 1 discloses all of the limitations.

In re claims 15-18 the Rossmann modification in re claim 1 discloses all of the structural limitations and inherently discloses the method steps recited. In re claims 15-17 the Rossmann modification in re claim 1 does not explicitly disclose that the assembly method of the blade row requires the method steps as claimed. However, it would have been obvious to one having ordinary skill in the art to assemble the blade row of the Rossmann modification in re claim 1 by “assembling a first rotating blade on a turbine rotor;  
assembling a second rotating blade on the turbine rotor so the first rotating blade and second rotating blade are adjacent;

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installing a support element between the first rotating blade and the second rotating blade, the support element located approximately in the blade center region;  
coupling the first rotating blade to the second rotating blade; and  
providing blade shrouds located on the tips of the blades, each blade shroud including a saw-tooth-shaped contact region such that adjacent blade shrouds are attached one inside the other thereby restricting blade movement about a center of axis of rotation wherein the first and second blades are formed from titanium” since it is one of a finite number of identifiable assembly methods which results in the structure of the Rossmann modification in re claim 1 as a predictable solution with a reasonable expectation of success.

In re claims 4, 14 and 17 it appears as though Appellants inadvertently changed “titanium alloy” to “titanium”. This inadvertent change would create a 35 U.S.C. 112 rejection very similar to the one found in the Final Office Action dated February 17 2009. It is for this reason that claims 4, 14 and 17 are interpreted as reading “titanium alloy” and not “titanium”.

#### **(10) Response to Argument**

**The Final Rejection of Claims 1-18 under 35 U.S.C. §103(a) as being unpatentable over Rossmann (USPN 5,474,421) in view of Popp (USPN 4,659,282) and further in view of Namura et al. (USPN 5,498,136).**

Appellants argue that the purpose of Rossmann is to increase the life of turbine rotor disks, blades and bladed rotor disks by reducing the overall weight of the blades that the disk must support and that replacing the silicon carbide blades of Rossmann

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with the titanium alloy blades of Popp would increase the total blade weight as compared to the metallic and ceramic combination taught by Rossmann. While Examiner agrees with this assessment, the point is moot because this is not the modification proposed by Examiner. The proposed modification is to replace **all** of the blades of Rossmann with the titanium alloy blades of Popp. The metals proposed for the blades of Rossmann include Nickel and Cobalt, both of which have a higher density than titanium. Replacing the silicon carbide blades of Rossmann with titanium blades would increase the overall weight of the blades; however, also replacing the nickel or cobalt based blades of Rossmann with titanium alloy blades would offset this weight gain resulting in an overall weight reduction of the blades.

Appellants also argue that the addition of Namura et al. would add upper and lower connecting wires that join adjacent blades together just above and below a radial mid section to tie the blades together. Examiner disagrees with this assessment of Namura et al. It can be seen in Figures 1, 5, 8, 9, 10, 19 and 38 that Namura et al. discloses a support element arranged between adjacent blades of a blade row and located approximately in the blade center region and coupling the adjacent blades.

#### **(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Aaron R. Eastman/

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Examiner, Art Unit 3745

Conferees:

/Edward K. Look/  
Supervisory Patent Examiner, Art Unit 3745

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Supervisory Patent Examiner, Art Unit 3748